[illegible]

Member of Swanton Bluffs—Two or more flows characterized by intermediate to high MgO contents (13.9 to 4.5 wt percent) and normal magnetic polarity. Underlies most of northwestern part of map area as well as the topographically complex area between the Lewis and Clark Rivers in Washington. Composed of olivine phenocrysts and glomerocrysts of plagioclase and olivine as large as 1 cm across in microphyre, interspersed to intergranular groundmass; minor olivine commonly present in groundmass. Magnetization is normal thick-bedded. Chemistry, petrography, and remanent magnetization direction (J.T. Hagstrum, written comm., 1999) indicate equivalence with Swanton Bluffs unit of Reid and others (1989). Based on ⁴⁰Ar/³⁹Ar dates of 15.6 to 15.8 Ma (Reid, 1989), which is within the N₁ magnetostratigraphic unit of Swanson and others (1979) and was emplaced at 15.6 to 6.2 Ma (Long and Duncan, 1983).

Member of Winter Water—Sparsely plagioclase-phryic to glomerophytic basalt with relatively low MgO content (about 3.6 to 3.9 wt percent) and normal magnetic polarity; contains scattered plagioclase phenocrysts 1 to 3 mm across in aphyric to sparsely microphyric groundmass. Underlies member of Sentinel Bluffs (Tgsb); approximately 20 to 40 m thick. Chemical and paleomagnetic properties indicate probable correlation with Winter Water unit of Reidel and others (1989; Beeson and others, 1989; Wells and others, 1989), which is within the N. magnetostrophic unit of Swanson and others (1979).


Member of Ortley—Aphyric, intersertal to intergranular basalt with relatively low MgO contents (3.5 to 3.6 wt percent) and normal magnetic polarity. Underlies member of Winter Water (Tgw_w) in northern Saint Helena where about 25 m of this flow exposed. Chemically and palaeomagnetically equivalent to Ortley unit of Reide and others (1989; Beeson and others, 1989; Wells and others, 1989), which is within the N₁ magnetostratigraphic unit of Swanson and others (1979).

Pittsburg Bluff Formation (Oligocene)—Shown on cross section only. Massive, friable, well-bedded, fine- to coarse-grained, tuffaceous, argillaceous, and lithic sandstone, siltstone, shale, and rare granule and pebble conglomerate. Depositional environments range from shallow marine to subaerial. Outcrops to north and northwest of quadrangle contain a molluscan fauna similar to that in the Eocene—Oligocene Pittsburg Bluff Formation (Wilkinson and others, 1946; Everts, 2002)

Volcanic rocks, undivided (Eocene)—*Shown on cross section only.* Undifferentiated mafic to silicic lava flows and volcanoclastic rocks of the western Cascade Range

 Contact—Dashed where approximately located; short-dashed where inferred

 Fault—Dashed where approximately located; dotted where concealed. Teeth on hanging wall; bar and ball on down-thrown side; arrows show relative horizontal motion

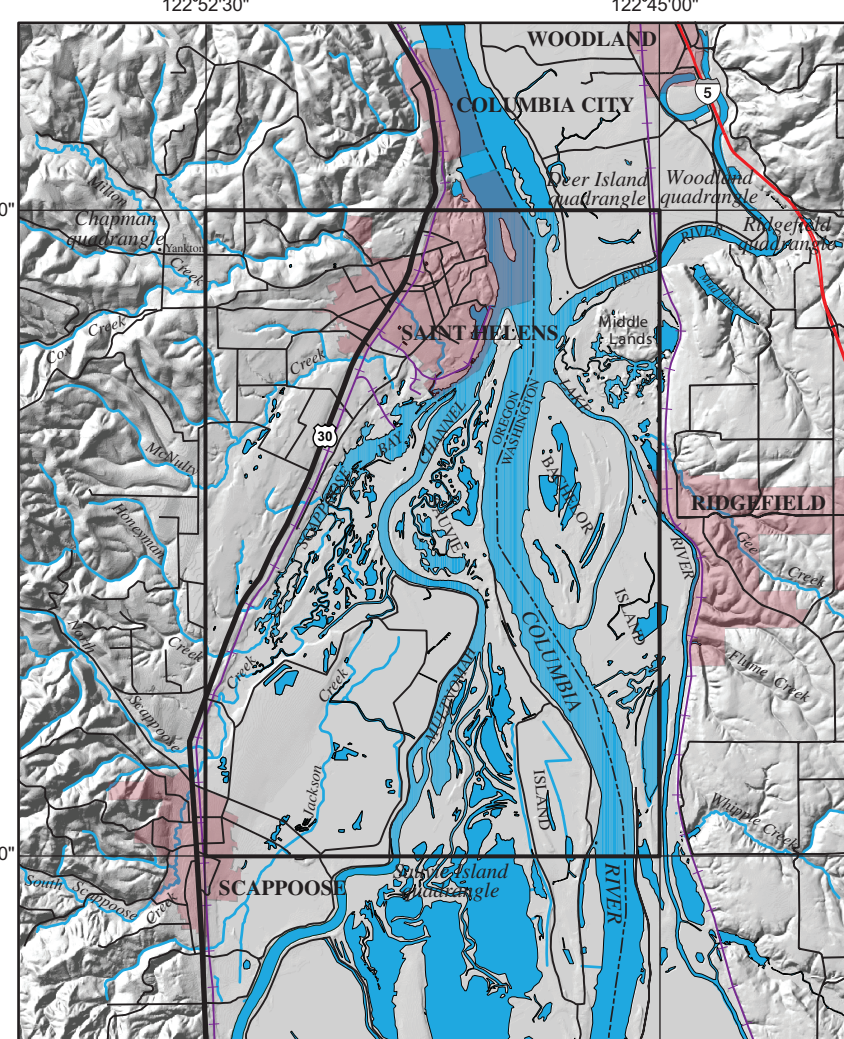
 **Syncline**—Dashed where approximately located; dotted where concealed. Arrow shows direction of plunge

•⁵ Sample locality for chemical analysis—See table 1

● Sample locality for paleomagnetic analysis

- **Water well—**

Glacial erratic



Index map showing geographic and cultural features mentioned in text (hillshade image)

